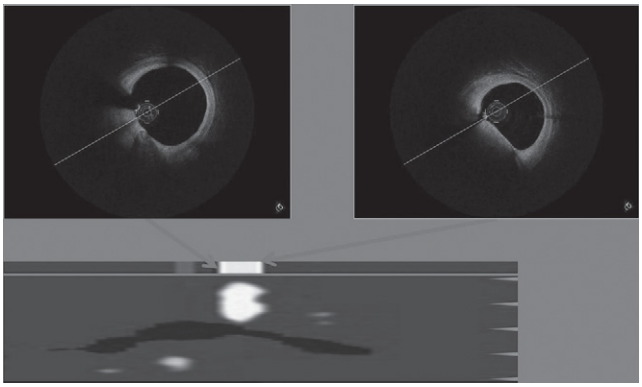

Conclusion: There was very good correlation between the presence, absence, and spatial distribution of lipid pools as noted on OCT and NIRS imaging. Larger studies are required to determine whether NIRS and OCT provide complementary information for plaque characterization.

TCT-651

Assessment of the bioresorption process utilising intravascular ultrasound derived echogenicity analyses and vasomotion testing of the ABSORB bioresorbable everolimus-eluting vascular scaffold. A substudy of the ABSORB Cohort B trial

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Background: Reduction in the hyper-echogenicity characteristics of the ABSORB scaffold has been demonstrated to be related to the recovery of vasoreactivity of the scaffolded segment at 2 years. Subsequent changes in the platform design and manufacturing processes lead to significant prolongation in the lumen support with a new revision of the device . We sought to correlate the reduction in hyper-echogenicity of the revised ABSORB with the recovery of vaso-reactivity of the scaffolded segment during this time period.
Methods: All patients from the ABSORB trial, who underwent paired echogenicity analyses and vasomotion testing at 6 (ABSORB Cohort B1) or 12 (ABSORB Cohort B2) months follow-up, were included in the analysis. Vasoreactivity was calculated as relative mean lumen diameter (MLD) changes from pre to post acetylcholine administration
Results: Overall, 31 patients underwent paired IVUS derived echogenicity analyses and vasomotion testing at 6 (n=14) and 12-month (n=17) follow-up respectively. The reduction in hyper-echogenicity of the scaffolded segment in the acetylcholine test group went from 20.04±10.01 % to 18.09±10.01%, (p=0.561) and from 23.89 ± 9.99 % to 18.16 ± 8.70 % (p=0.006) at 6 and 12 months, respectively. The changes in MLD after administration of acethylcoline were 1% of vasodilation (p=0.405) and 4% vasoconstriction (p=0.086) at 6 and 12 months, respectively. A significant relationship between the changes in hyper-echogenicity and in MLD after acethylcoline administration was demonstrated at 12 months (Spearman rho=-0.678, p=0.0154), but not at 6 months (Spearman rho=-0.3778, p=0.252)
Conclusion: The reduction in hyperechogenecity of the scaffolded segment is significantly correlated with the restoration of the vasomotor activities of a coronary segment scaffolded by the ABSORB scaffold at a long-term follow-up. This is consistent with the programmed loss of structural integrity of the scaffold at that time point.

TCT-652

In Vivo Distribution Of Lipid Core Containing Plaque According To Distance From The Ostium By Near Infrared Spectroscopy In Non-cuprit Coronary Arteries

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Background: Anatomo-pathological data indicate that coronary plaques prone to rupture and erosion tend to cluster within the proximal third of each coronary vessel. Intracoronary NIRS is a novel method to detect lipid core plaques (LCP). We sought to assess the spatial distribution of lipid core plaques (LCP) by means of near infra red spectroscopy (NIRS) in coronary arteries.
Methods: Sixty-eight consecutive patients underwent NIRS imaging on a non culprit coronary artery. The region of interest (ROI) was subsequently divided into 10-mm segments from proximal to distal. The 2-mm long block chemogram value (probability of LCP, ranging from 0–low probability- to 1 –high probability) was assessed per ROI and per each 10-mm segment.
Results: Overall, the length of the ROI was 58.0±4.3 mm, subdivided into 10-mm segments for a total of 392 analyzed segments. There was a progressive decrease of LCP from proximal to distal in the various 10-mm segments (1st 0.41[0.34-0.48] vs. 2nd 0.35[0.29-0.42] vs. 3rd 0.37[0.30-0.43] vs. 4th 0.32[0.26-0.39] vs. 5th 0.26[0.20-0.33] vs. 6th 0.26[0.19-0.33], p=0.011). While in LAD and in LCx, LCP tended to cluster in the proximal segment (p<0.001 and p=0.001, respectively), in the RCA they were evenly distributed along the artery (p=0.155). At logistic regression analysis, distance from the ostium was the only independent predictor of LCP.
Conclusion: Lipid-core plaques, as detected by NIRS, cluster in the proximal segment of the coronary arteries, in distribution similar to that observed in prior autopsy studies. The distribution of LCP is similar to that of the culprit lesions of STEMI patients.

TCT-653

Quantitative and Qualitative Changes of Neointimal Tissue in Drug Eluting Stents [Serial (9 Months and 2 Years) Observation using Intracoronary Optical Coherence Tomography]

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Background: The long-term serial change of stent strut coverage and neointima characteristics in DESs have not been fully investigated with OCT. This study tried to evaluate the serial quantitative and qualitative changes of vascular response in drug eluting stents (DES) at 9 months and 2 years using optical coherence tomography (OCT).
Methods: The OCT was performed serially in 80 DESs of 76 patients at 9 months and 2 years after DESs implantation (sirolimus-eluting stent [SES], n=23; paclitaxel-eluting stent [PES], n=20; zotarolimus-eluting stent [ZES], n=25, everolimus-eluting stent [EES], n=12). Serial change of quantitative (neointimal thickness, stent strut coverage and apposition at each strut) and qualitative characteristics were evaluated.
Results: The incidence of uncovered stent strut significantly decreases from 9 months to 2 years follow-up (4.9 % to 2.6 %, p<0.001), but there was similar for malapposition rate (1.0 % to 1.1 %, p=0.63) and incidence of intracoronary thrombi (10.0 % to 8.8 %, p=0.79). In qualitative evaluation, lipid laden neointima (13.8% to 26.3%, p=0.03) and intimal disruption (13.8% to 33.8%, p=0.03) were more frequently detected at 2 years follow-up compared to 9 months follow-up.
Conclusion: This OCT study suggested that neointimal coverage improved from 9 months to 2 years, but prevalence of malappostion and thrombus was not changed during extended follow-up. Additionally, the neoatherosclerosis including transforming into lipid laden neointima might progress between 9 months and 2 year-follow period.

TCT-654

Quantitative multi-modality imaging analysis of a fully bioresorbable scaffold: a head-to-head comparison between QCA, IVUS and OCT

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Background: The bioresorbable vascular scaffold (BVS) has peculiar imaging characteristics, like total translucency and radiolucency. We analyze the agreement between QCA, IVUS and OCT in the BVS for length and minimum lumen area (MLA) measurements immediately post-implantation and at 6 months.
Methods: Patients enrolled in the ABSORB cohort B1 study (NCT00856856) underwent coronary angiography, IVUS and OCT immediately post BVS implantation and at 6 months. Agreement between QCA edge detection (ED), QCA videodensitometry (VD), IVUS and OCT regarding scaffold length and MLA was analyzed through intraclass correlation coefficients and Passing-Bablock non-parametric orthogonal regression.
Results: 45 patients were sequentially imaged. OCT estimates scaffold length accurately compared to nominal length (95% CI of the difference: -0.15; 0.34 and -0.13; 0.47mm for baseline and 6 months, respectively), whereas QCA incurs consistent underestimation of the same magnitude at both time points (Pearson correlation = 0.806). IVUS yields low accuracy (95% CI of the difference: 1.04; 3.24 and -0.56; 2.65mm2 for baseline and 6 months, respectively), with several outliers and random variability test-retest. MLA decreases substantially between baseline and 6 months in QCA and OCT, but only minimally in IVUS (95% CI: 0.12, 0.52 mm2). ICCa and Bland-Altman show poor agreement for MLA between the different imaging modalities: worst agreement ED-IVUS post-implantation (ICCa 0.253); best agreement IVUS-OCT at 6 months (ICCa 0.767). All the pairs deviated significantly from linearity (p<0.01). Passing-Bablock non-parametric orthogonal regression showed constant and proportional bias between IVUS and OCT.
Conclusion: OCT is the most accurate technique for measurement of scaffold length; QCA incurs systematic underestimation (foreshortening) and IVUS is the most inaccurate and unpredictable modality. This has implications for volumetric